**Tampereen yliopisto
Tampere University**

TIE-02306
Introduction to Software Engineering

5 credit units

09-projwork-ItSE2019-v4

**Tampereen yliopisto
Tampere University**

Course contents (plan)

1. Course basics, intro
2. Sw Eng in general, overview
3. Requirements
4. Different software systems
5. Basic UML Diagrams ("Class", Use Case, Navigation)
6. UML diagrams, in more detail
7. Life Cycle models
8. Quality and Testing
9. **Project work**
10. Project management
11. Open source, APIs, IPR
12. Embedded systems
13. Recap

9. Project work

- working in a project
- from group work to teamwork
- common problems / pitfalls
-
- soft skills, people = Human Potential ("human matters")
- motivation
-
- tools
-
- patterns

Current at course (w 44)

- **WE8 this week**   (quality and testing)
- after those we think next week WE9 groups

- **continue updating your Trello (kanban) boards** = use at your process

- **EXAM 1/3** (28 students, 4..35 min, 7..12 points)
- *remember EXAM 2/3 (weeks 44-46); diagrams (Dia or EA tool)*

- **1st presentations group-to-group feedback at PRP system**

Tietotekniikan yö 5 (5th ICT Night), 05.11.2019, TB104, 17-
IT-Hekuma 13.11.2019 at Tietotalo and Sähkötalo.
InnoEvent (04-08.11.2019)   www.innoevent.fi

Backlog items with deadline

- **09.09.2019** at 23:59   Group forming (Moodle)
- **15.09.2019** at 23:59   Trello creation (Trello)
- **13.10.2019** at 23:59   Phase 1 documentation (Moodle)
- **13.10.2019** at 23:59   Phase 1 presentation slides (PRP-tool)
- **Week 43**   Phase 1 presentations (Physical realm)
- **03.11.2019** at 23:59   Phase 1 peer feedback (PRP-tool)
- **17.11.2019** at 23:59   Phase 2 documentation (Moodle)
- **17.11.2019** at 23:59   Phase 2 presentation slides (PRP-tool)
- **Week 47**   Phase 2 presentation (Physical realm)
- **01.12.2019** at 23:59   Phase 2 peer feedback (PRP-tool)
- **08.12.2019** at 23:59   Final delivery of project documentation (Moodle)
- **15.12.2019** at 23:59   Final peer feedback and self assessments (PRP-tool).

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Weekly exercise attendees

	w36 WE1	w37 WE2	w38 WE3	w39 WE4	w40 WE5	w41 WE6	w44 WE7	w45 WE8	w46 WE9	w48 WE10
WED	0	14	9	5	8	9	9			
THU	21	13	14	17	16	13	6			

We will continue two Weekly Exercise groups, as long as the number of attendees are reasonable.

Some annual DAYs…

International Programmer's Day 13.09.2019
Software Freedom Day 21.09.2019

International Project Management Day 07.11.2019
**World Usability Day 14.11.2019**
World Quality Day 14.11.2019

Some general advice to groups...

- coding/working **nights/days** ("jams") are strongly recommended

- **motivational events** after some considerable effort (e.g. deliverable deadline), e.g. sauna party or just bar night

- plan breaks = holidays well and in advance. Share work to **everybody** and stick in the plan

- if you don't find a solution to a problem for 1..2 days, **ask help from your groupmembers**, you need not to bang your head to the wall for one alone before you dare to ask.

There is not only one right way to do the project.

Every group (team) is different and acts differently.
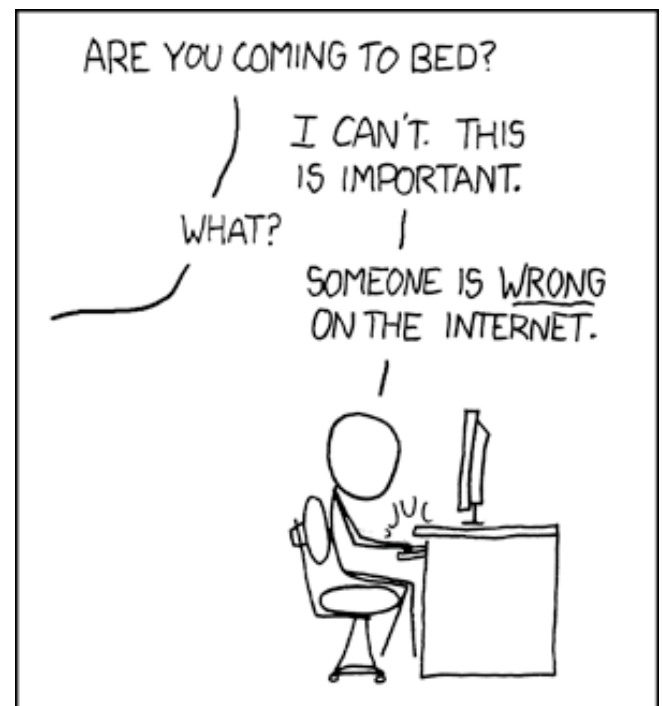
Some project thoughts...

"A man got to know his limitations"

[Dirty Harry movie character]

"The project goes well as long as less than half of the groupmembers are thinking about suicide."

[modified from expedition team handbook]

Development of project team

- **Forming**
  - Team members are quite dependent on leaders
  - Acting is careful and formal
  - Looking my place in the team

- **Storming**
  - Members are against leader or given mission/tasks
  - Testing leader and other team members
  - Conflicts and internal fights

- **Norming**
  - Starting to approve other's roles
  - Teamspirit starts to develop
  - Clearness of playing rules

- **Performing**
  - Productive, efficient and creative team
  - Working towards common targets
  - Clear commitment to given tasks.

Adapted from Tuckman 1965

TAMPERE UNIVERSITY OF TECHNOLOGY

05.11.2019   21

Managing people

✧ **People are an organisation's most important assets.**

✧ The tasks of a manager are essentially people-oriented. Unless there is some understanding of people, management will be unsuccessful.

✧ **Poor people management is an important contributor to project failure.**

People management factors

✧ **Consistency**
- Team members should all be treated in a comparable way without favourites or discrimination.

✧ **Respect**
- Different team members have different skills and these differences should be respected.

✧ **Inclusion**
- Involve all team members and make sure that people's views are considered.

✧ **Honesty**
- You should always be honest about what is going well and what is going badly in a project.

Motivating people

✧ An important role of a manager is to **motivate** the people working on a project.

✧ Motivation means organizing the work and the working environment to **encourage people to work effectively**.
- If people are not motivated, they will not be interested in the work they are doing. They will work slowly, be more likely to make mistakes and will not contribute to the broader goals of the team or the organization.

✧ Motivation is a complex issue but it appears that their are different types of motivation based on:
- Basic needs (e.g. food, sleep, etc.);
- Personal needs (e.g. respect, self-esteem);
- Social needs (e.g. to be accepted as part of a group).

Human needs hierarchy

Self-realization needs

Esteem needs
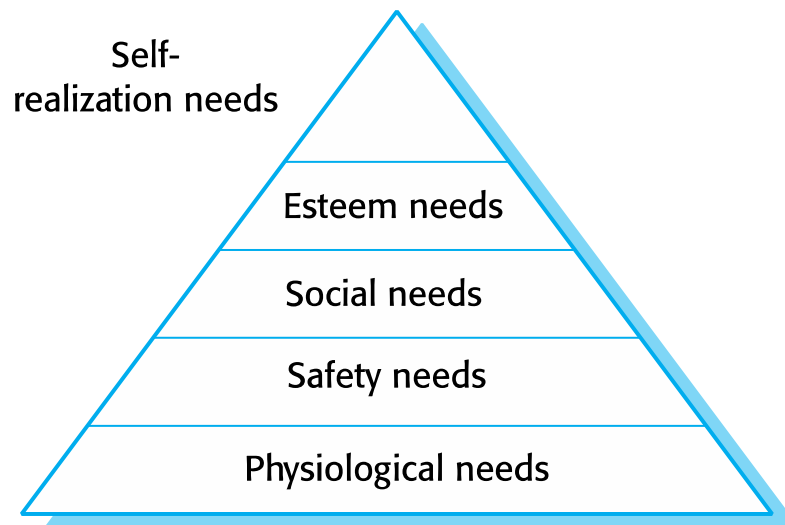
Social needs

Safety needs

Physiological needs

Need satisfaction

✧ In software development groups, basic physiological and safety needs are not an issue.

✧ Social
- Provide communal facilities;
- Allow **informal communications** e.g. via social networking

✧ Esteem
- **Recognition** of achievements;
- Appropriate **rewards**.

✧ Self-realization
- **Training** - people want to learn more;
- Responsibility.

Personality types

✧ The needs hierarchy is almost certainly an over-simplification of motivation in practice.

✧ **Motivation should also take into account different personality types:**

- **Task-oriented** people, who are motivated by the work they do. In software engineering.
- **Interaction-oriented** people, who are motivated by the presence and actions of co-workers.
- **Self-oriented** people, who are principally motivated by personal success and recognition.

Personality types

✧ Task-oriented.

- The motivation for doing the work is the work itself;

✧ Self-oriented.

- The work is a means to an end which is the achievement of individual goals - e.g. to get rich, to play tennis, to travel etc.;

✧ Interaction-oriented

- The principal motivation is the presence and actions of co-workers. People go to work because they like to go to work.

Motivation balance

✧ Individual motivations are made up of elements of each class.

✧ The balance can change depending on personal circumstances and external events.

✧ **However, people are not just motivated by personal factors but also by being part of a group and culture.**

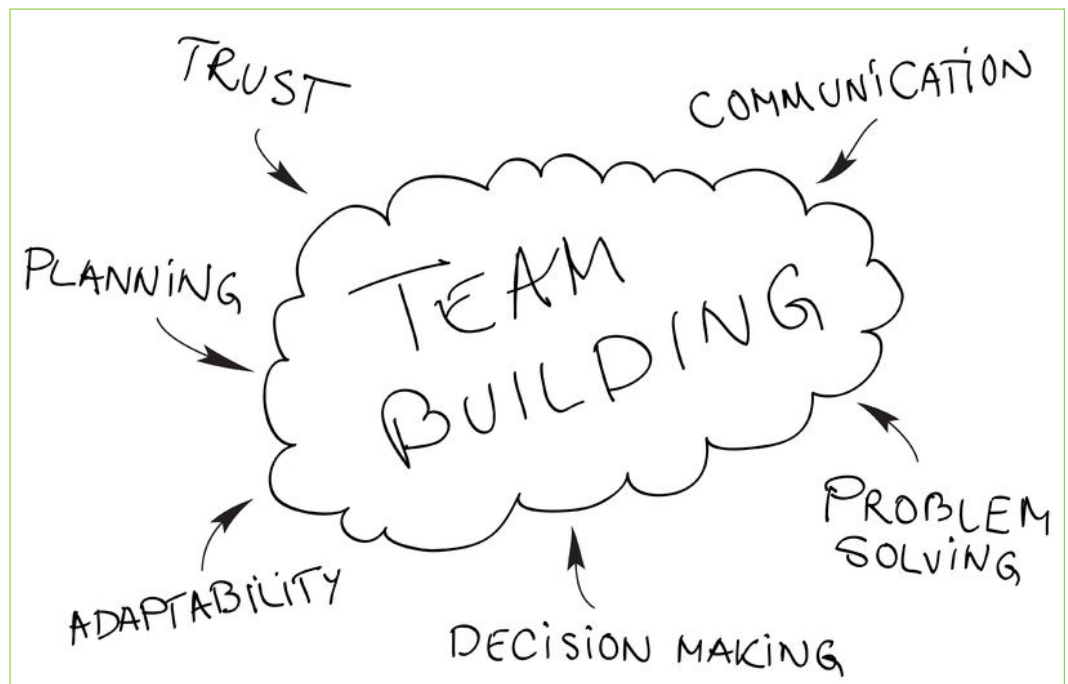✧ People go to work because they are motivated by the people that they work with.

Discuss about work problems with your colleagues, sometimes you discover the answer when you explain the problem to someone.

PROBLEM SOLVING FLOWCHART
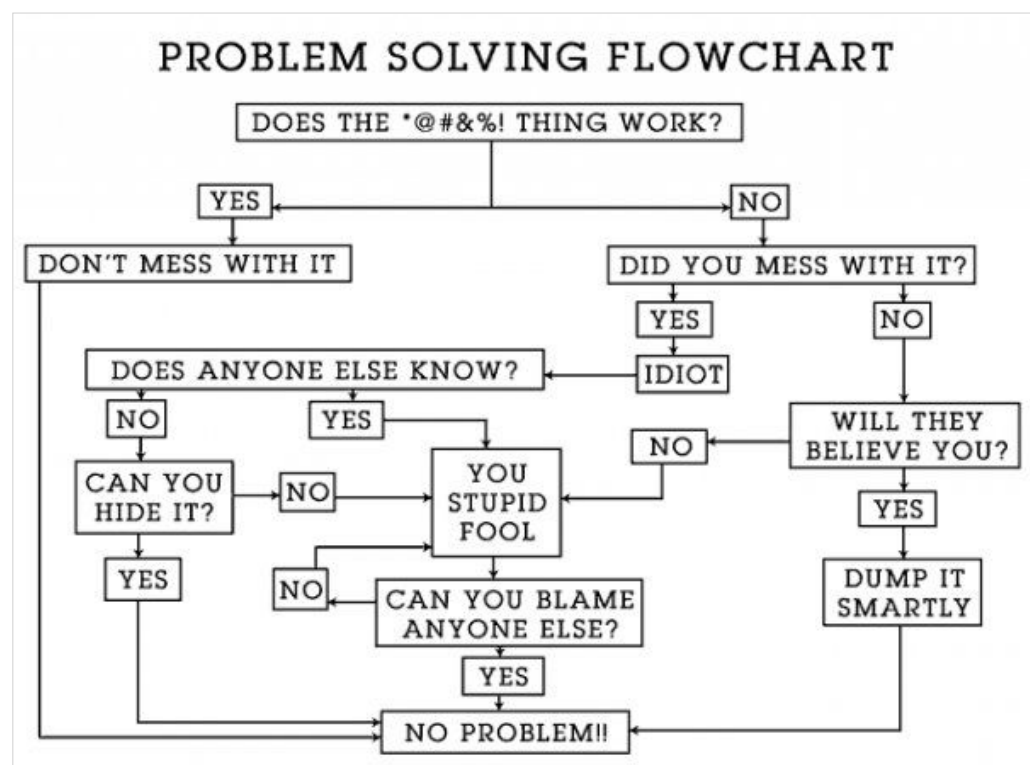
Team Spirit (cohesion) would be good for project working.

In a good Team, everybody knows…

- **Who we are**…
- What is our **goal**…the same goal !
- How to **communicate** with others….
- Who is **making decisions**…..on what
- Who is **available** and when…
- Who is **responsible**…and about what
- What is **our plan**…to achieve goals !
- What are **my tasks**… and what others have !
- What kind of **competencies** I have…and others have !
- What **role** (s)he has in the team !

   Trust !

Building a Team…

Everybody should have…

- **Trust to him/herself…and others !**
- **Skills** to be a member of my team !
- **Tools for successful communication** !
- Knowledge about the **SW process**…and our implementation of it !
- Knowledge about **tools** we are using !
- **Support** from others…when needed !
- **Innovative attitude** to content creation !
- **Motivation** to work for our project !
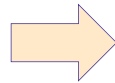
Successful Team !

Successful team… 1

- **Recognize the power of teamwork**
  - Take a moment to appreciate the power of teamwork and how you can best utilize this tool.
  - Consider the result you want and the tasks you think are required to achieve it.
  - As you think about your team members, match their skills to the tasks of the project, but also identify personalities you feel complement one another.
  - A successful team project maximizes the talents of its individual members, but the true power of teamwork comes from the group's cohesion and combined energies focused on a common goal.

- **Choose the right people**
  - If you want your team to be really effective, you'll need to get the right people for the job.
  - If, for example, you're trying to come up with a new way to communicate using new social media tools, then be sure to include all stakeholders.
  - Try to choose people for your team who together will provide a broad perspective on your project.

- **Authority and Responsibility**
  - Once you've your team, make sure that everybody has the authority and access what the team needs to complete the project. Industrious, energetic, and creative people will become frustrated very quickly if they do not have the freedom, access to tools, and other resources they need to complete their work.
  - Avoid telling other members of a team what to do and how to do it. Instead, work with them to set goals, and then remove together obstacles and provide the support team needs to achieve their goals.
  - As project manager, your job becomes making sure they can do theirs.

Successful team... 2

- **Monitor progress**
    - In an ideal world, you'll have exactly the right people in your team, and everything will take care of itself.
    - In the real world, always have to verify that the team is working well together and that the project is on track. Provide, as necessary, a forum where team members can share concerns, successes, and project status on a regular basis.
    - When a team identifies, addresses, and pushes through obstacles on its own, individuals draw closer together, and their success gives rise to confidence.

- **Celebrate your successes**
    - When your team accomplishes or exceeds its goals, then be sure to celebrate it.
    - At minimum, schedule a final team meeting where you can discuss collectively and describe the positive impact their work will have on you and your customer.
    - One hallmark of an outstanding team is camaraderie. The team's success will build on itself, and your team and your organization will be the better for it as the team and as the individuals takes on more responsibility on future coming projects

Framework based http://www.inc.com/peter-economy/5-steps-to-really-effective-teams.html

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Team roles 1/3

Belbin's team roles are:

Shaper
- The Shaper is a **dynamic, outgoing member of the team**; they are often argumentative, provocative and impatient.
- These traits may mean that they cause friction with other, especially people-orientated, members of the group. Due to the personality of the Shaper they **push the group towards agreement and decision making, keen to remove barriers and embrace challenges**.

Implementer
- Implementers **get things done** – they have the ability of transforming discussions and ideas into practical activities.
- Implementers are conscientious, **wanting things to be done properly**. They are **very practical and organised in nature** hence their ability to get the job done. Implementers can be stuck in their ways, not always open to new ideas and way of doing things. Implementers would **rather stick to old, tried and tested methods** than to embrace change and innovation.

Completer-Finisher
- The Completer/Finisher is a **task-orientated member of the group** and as their name implies they **like to complete tasks**.
- The Completer/Finisher can be an anxious person **worried about deadlines and targets** – they are perfectionists and have good attention to detail but also worry about delegating tasks. They would **rather do something themselves** and know that it was done properly than delegate to somebody else.
- **Delegation can be a challenge** for many people, see our page Delegation Skills for more information.

Coordinator/ Chairperson

- The Coordinator is **often a calm, positive and charismatic** member of the team.
- Coordinators **take on leadership or chairperson roles** by clarifying goals and objectives, helping to allocate roles, responsibilities and duties within the group. The Coordinator has **excellent interpersonal skills**, being able to communicate effectively with team members through good listening, verbal and non-verbal communication.

Team Worker

- The Team Worker **helps by giving support and encouragement to the other members** of the team.
- This team-oriented member is **concerned about how others in the team are managing**. Team Workers have sensitive, outgoing personalities and are happy to listen and act as the team counsellor.
- Team Workers are usually **popular members of the team**, able to effectively negotiate and work towards the good of the group. Team Workers can, however, be indecisive in group decisions – torn between the welfare of members and the ability of the team to deliver.

Resource Investigator

- The Resource Investigator is a **strong communicator, good at negotiating** with people outside the team and gathering external information and resources.
- Resource Investigators are **curious and sociable in their nature they are open to new ideas** and ways of accomplishing tasks. Being **flexible, innovative and open to change**, Resource Investigators are listened to by other team members. Sometimes, however, they are unrealistic in their optimism.

Plant

- The Plant is an **intellectual and individualistic** member of the team.
- The Plant is **innovative and will suggest new and creative ways of problem solving** within the team. Sometimes the ideas of the Plant may be impracticable due to their **highly creative nature** – they **may ignore known constraints** when developing their ideas. Plants are often introverts who may have poor communication skills, they are **loners and enjoy working away from the rest of the group.**

Monitor Evaluator

- The Monitor Evaluator is **unlikely to get aroused in group discussions** – they **tend to be clever and unemotional**, often detected from other members of the team.
- The monitor evaluator will **critically evaluate and analyse the proposals,** ideas and contributions of others in the team. Monitor Evaluators carefully weigh up advantages and disadvantages, strengths and weaknesses of ideas and proposals and therefore are usually good decision makers.
- Monitor evaluators are keen critical thinkers.

Specialist

- The Specialist has **expert knowledge in some area that is vital** to the success of the group.
- The specialist provides **knowledge and skills in this narrow area**. Dwelling on practicalities in their expert area the Specialist **may have problems applying their expertise to the wider goals** of the team. Specialists tend to be single-minded and professional.

Summary of Group Roles

- It is perfectly **possible for people to adapt to different team roles at different times**. Although you may recognize your personality type in the descriptions above you will almost certainly adopt different roles in different scenarios. Team **roles often become more prevalent when a team or group has had time to reach maturity** and develop cohesiveness.

Find more at: http://www.skillsyouneed.com/ips/group-roles.html#ixzz4JjshGusP
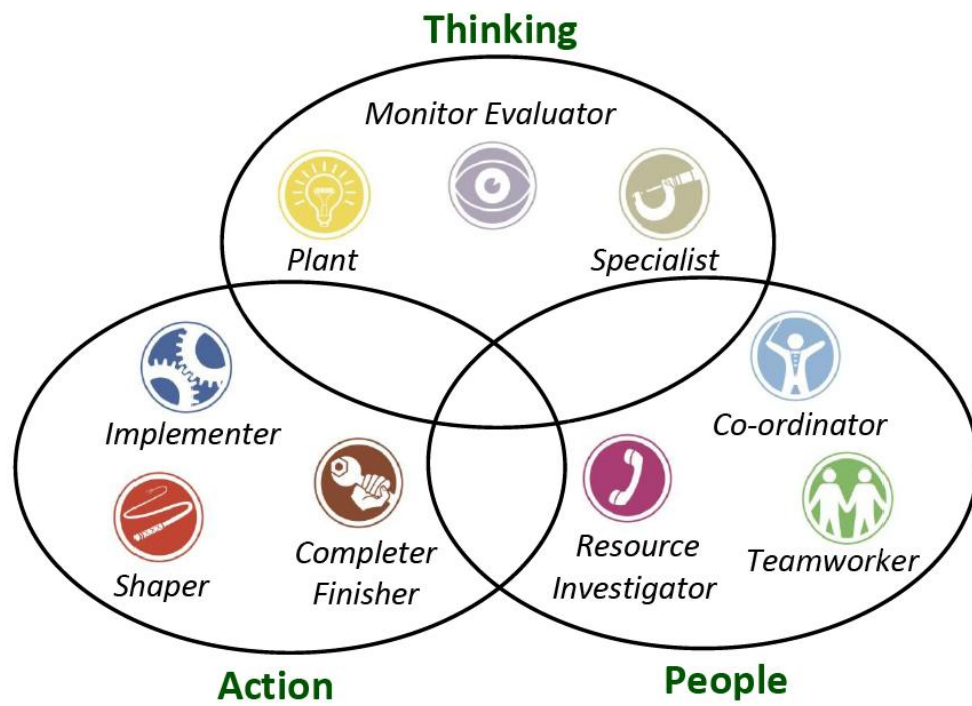
Teamwork

Successful attributes needed for effective teamwork

- Commitment to team success and **shared goals**

- Interdependence (team is more than just sum of members)

- Interpersonal Skills (e.g. **discuss openly**, be honest and supportive)

- Open Communication and positive feedback

- Appropriate team composition (everybody knows his/her role)

- **Commitment** to team processes, leadership & accountability.

[Pina Tarricone: Successful teamwork: A case study, 2002]

"We like to bring together people from radically different fields and wait for the friction to produce heat, light and magic. Sometimes it takes a while."

Teamwork

✧ **Most software engineering is a group activity**
  - The development schedule for most non-trivial software projects is such that they cannot be completed by one person working alone.

✧ A good group is cohesive and has a **team spirit**. The people involved are **motivated by the success of the group** as well as by their own personal goals.

✧ **Group interaction is a key determinant of group performance.**

✧ Flexibility in group composition is limited
  - Managers must do the best they can with available people.

Group cohesiveness

✧ In a cohesive group, **members consider the group to be more important than any individual in it**.

✧ The advantages of a cohesive group are:

- Group **quality standards** can be developed by the group members.
- Team members **learn from each other** and get to know each other's work; Inhibitions caused by ignorance are reduced.
- **Knowledge is shared**. Continuity can be maintained if a group member leaves.
- Refactoring and **continual improvement is encouraged**. Group members work collectively to deliver high quality results and fix problems, irrespective of the individuals who originally created the design or program.

Team spirit

Alice, an experienced project manager, understands the importance of creating a cohesive group. As they are developing a new product, she takes the opportunity of involving all group members in the product specification and design by getting them to discuss possible technology with elderly members of their families. She also encourages them to bring these family members to meet other members of the development group.

Alice also arranges monthly lunches for everyone in the group. These lunches are an opportunity for all team members to meet informally, talk around issues of concern, and get to know each other. At the lunch, Alice tells the group what she knows about organizational news, policies, strategies, and so forth. Each team member then briefly summarizes what they have been doing and the group discusses a general topic, such as new product ideas from elderly relatives.

Every few months, Alice organizes an 'away day' for the group where the team spends two days on 'technology updating'. Each team member prepares an update on a relevant technology and presents it to the group. This is an off-site meeting in a good hotel and plenty of time is scheduled for discussion and social interaction.

The effectiveness of a team

✧ The people in the group
  ▪ You need a **mix of people** in a project group as software development involves diverse activities such as negotiating with clients, programming, testing and documentation.

✧ The group organization
  ▪ A group should be organized so that individuals can **contribute** to the best of their abilities and tasks can be completed as expected.

✧ Technical and managerial communications
  ▪ **Good communications** between group members, and between the software engineering team and other project stakeholders, is essential.

Dimensions of project roles

- **Look up** (Ensure that management is engaged)
- **Look out** (Ensure that project reflects customers, end-users, etc. expectations)
- **Look forward** (Plan & ensure that project group sets realistic targets and have resources to achieves those)
- **Look forward** (Plan & ensure that project group sets realistic targets and have resources to achieves those)
- **Look down** (Lead the team. Maximize team's performance through individuals)
- **Look inside** (Lead yourself by evaluating your work. Make sure that your contribution gives added value to project)
- **Look back** (Follow progress with relevant tools and so ensure that project will achieves targets and team is learning from mistakes)

Project Manager role

- **Look up** (Ensure that Project manager supports your work)
- **Look out** (Ensure that your work results are following the plan (time spend, results, quality)
- **Look forward** (Plan & ensure that you have realistic targets and you will have needed resources to achieve those)
- **Look around** (Try to improve your team's performance by supporting others.)
- **Look inside** (Lead yourself by evaluating your work. Make sure that your contribution gives added value to project)
- **Look back** (Follow your progress with agreed tools and ensure that you will achieve your individual targets and you are learning from your mistakes)

Project team member role

Selecting group members

✧ A manager or team leader's job is to create a cohesive group and organize their group so that they can work together effectively.

✧ This involves creating a group with **the right balance of technical skills and personalities**, and organizing that group so that the members work together effectively.

However, very seldom project manager can pick "the best selection" of company workers to his/her project. Usually it is just those who are available at the moment for a new project.

Assembling a team

✧ May not be possible to appoint the ideal people to work on a project
- Project budget may not allow for the use of highly-paid staff;
- Staff with the appropriate experience may not be available;
- An organisation may wish to develop employee skills on a software project.

✧ Managers have to work within these constraints especially when there are shortages of trained staff.

For example, TUNI Hervanta (= technical, ex-TUT) students would surely get a mobile game project done. But it would be a "disposable" game (play once and forget). With groupmembers also from other campuses the game would be better.

Group composition

✧ Group composed of members who share the same motivation can be problematic

- Task-oriented - everyone wants to do their own thing;
- Self-oriented - everyone wants to be the boss;
- Interaction-oriented - too much chatting, not enough work.

✧ **An effective group has a balance of all types.**

✧ This can be difficult to achieve software engineers are often task-oriented.

✧ Interaction-oriented people are very important as they can detect and defuse tensions that arise.

Group organization

✧ The way that a group is organized affects the decisions that are made by that group, the ways that information is exchanged and the interactions between the development group and external project stakeholders.

- Key questions include:
  - Should the project manager be the technical leader of the group?
  - Who will be involved in making critical technical decisions, and how will these be made?
  - How will interactions with external stakeholders and senior company management be handled?
  - How can groups integrate people who are not co-located?
  - How can knowledge be shared across the group?

Group organization

✧ Small software engineering groups are usually organised **informally** without a rigid structure.

✧ For large projects, there may be a hierarchical structure where different groups are responsible for different sub-projects.

✧ Agile development is always based around an informal group on the principle that formal structure inhibits information exchange.

Tensu: I do not believe in self-organising and self-managed project groups.

Informal groups

✧ The group acts as a whole and comes to a **consensus** on decisions affecting the system.

✧ The group leader serves as the external interface of the group but does not allocate specific work items.

✧ Rather, work is discussed by the group as a whole and tasks are allocated according to ability and experience.

✧ **This approach is successful for groups where all members are experienced and competent.**

Agile methods are supposed to be used by experienced teams only.

Group communications

◇ **Good communications are essential for effective group working.**

◇ Information must be exchanged on the **status of work**, design **decisions** and **changes** to previous decisions.

◇ Good communications also strengthens group cohesion as it promotes understanding.

Face-to-face (F-2-F) meetings "around the same table" are much better than e-mail.

Groups should agree **which communication channels** they use, and how.
Agree also how to use e-mail Subject line text (e.g. for important matters).

Group communications

◇ Group size
  - **The larger the group, the harder it is for people to communicate with other group members.**

◇ Group structure
  - Communication is better in informally structured groups than in hierarchically structured groups.

◇ Group composition
  - Communication is better when there are different personality types in a group and when groups are mixed rather than single sex.

◇ The physical work environment
  - Good workplace organisation can help encourage communications.

Remember: perhaps not everybody wants to be on the 5th level, like you.

As you have already noticed during your studies, individual performance varies during weekdays and hours. Some company people has said that even ten times (10x).

Remember also worker's ethics.
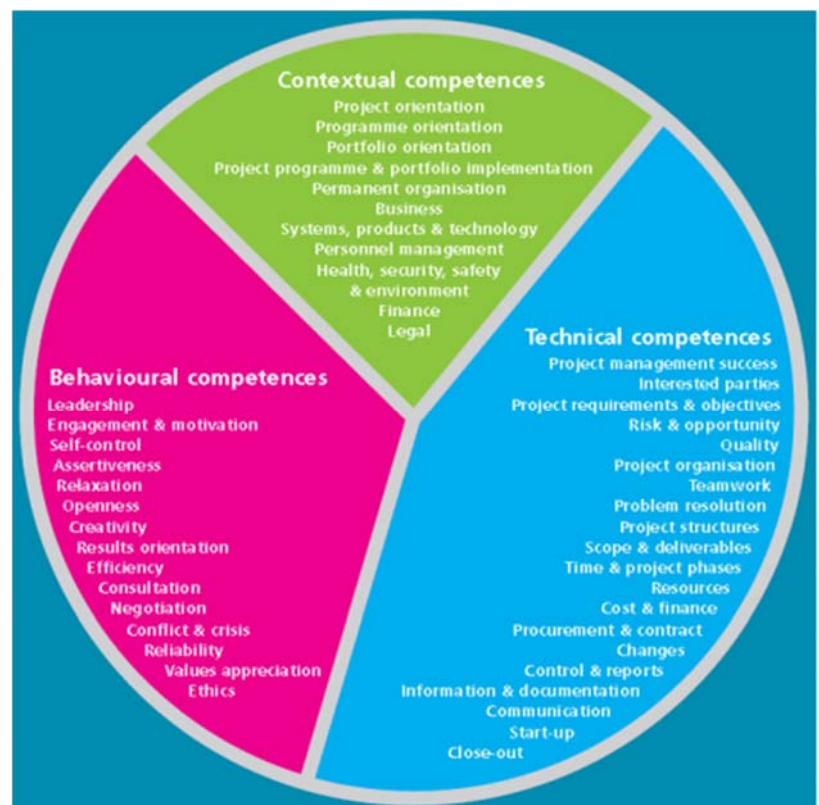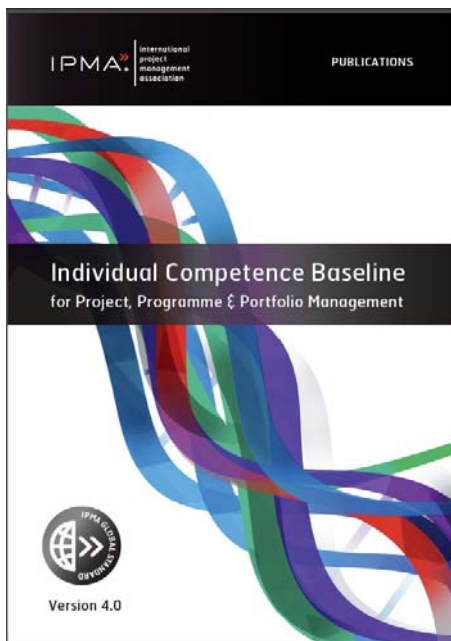
Common problems at student projects

Picked from OHJ-PROJ/TIE-PROJ final reports
- **tools (or skills for using those...)**
- **other hurries (work, other courses, hobbies,...)**
- **technical problems (environment, hw, sw,...)**
- **goals not understood right or agreed well**
- **misunderstandings and communication errors**
- **documentation errors and too abstract text**
- **not accurate enough workload guesses**
- **sickness, illness**
- **unfamiliarity of projects and/or application area**
- **incompatible www browsers**
- **poor meeting process handling (mostly waste of time).**

Possible conflicts in groups

- **Somebody may work less that others, others may think (s)he is a "free-rider".** But you have agreed average personal weekly working hours promises in start at Project Plan. It is OK to have different amount of working hours, if that is agreed within the whole group.

- **There may be some interpersonal problems, perhaps different working habits or cultural differencies, or most likely misunderstandings.** Solve all issues right away within your group.

Causes of conflicts in work groups
[Borg et al., 2011]

- **ambition differences** (will to do the best, or just do what is required)
- **cultural differences** (you just have to know or realise those)
- **bad communication** (there is no mind-reading)
- **strong wills** (personal differencies)
- **unclear goals** (who does and what)
- **different prior knowledge (studies)**
- **aversion towards methods/tools** ("I don't want to use Git").

Possible solutions to conflicts [Borg et al., 2011]

- **state group rules early & clearly**
- **encourage to discuss problems**
- **well-defined roles**
- **start work with small tasks.**

Agree communication channels and habits.

Project Plan may be considered a "group contract".
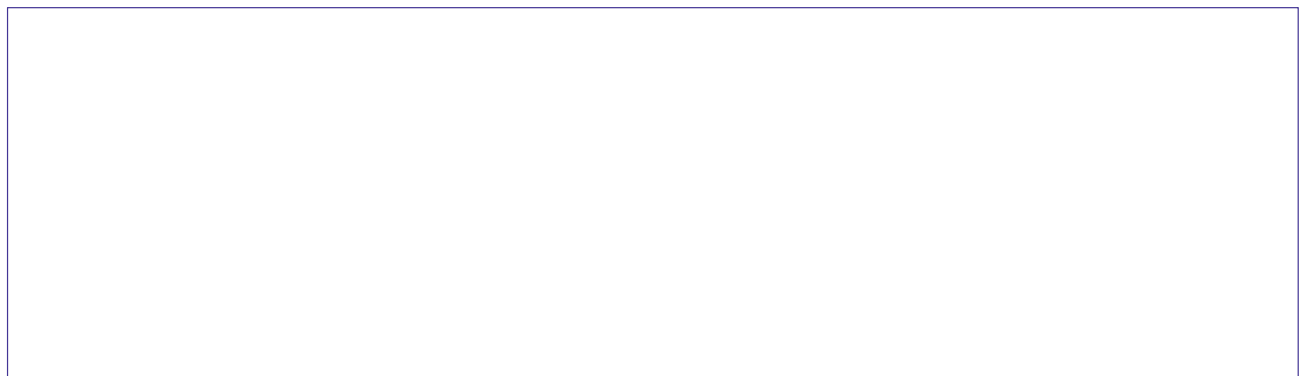
Project activites

◇ Project activities (**tasks**) are the basic planning element. Each activity has:

- a **duration** in calendar days or months,
- an **effort** estimate, which shows the number of person-days or person-months to complete the work,
- a **deadline** by which the activity should be complete,
- a **defined end-point**, which might be a document, the holding of a review meeting, the successful execution of all tests, etc.

At least some ″Lessons learnt″ or Final Report should be written from every project. Even just a one-page length text about what went well and why (″best practices″), as well as problems with solutions. So that future projects could learn from yours.

Milestones and deliverables

✧ **Milestones** (FI: etappi) are points in the schedule against which you can assess progress, for example, the handover of the system for testing.

✧ **Deliverables** (FI: vaihetuote) are work products that are delivered to the customer, e.g. a requirements document for the system.

Those should be clearly stated and measurable (DoD).

Tasks, durations, and dependencies

Task	Effort (person-days)	Duration (days)	Dependencies
T1	15	10	
T2	8	15	
T3	20	15	T1 (M1)
T4	5	10	
T5	5	10	T2, T4 (M3)
T6	10	5	T1, T2 (M4)
T7	25	20	T1 (M1)
T8	75	25	T4 (M2)
T9	10	15	T3, T6 (M5)
T10	20	15	T7, T8 (M6)
T11	10	10	T9 (M7)
T12	20	10	T10, T11 (M8)

Activity bar chart
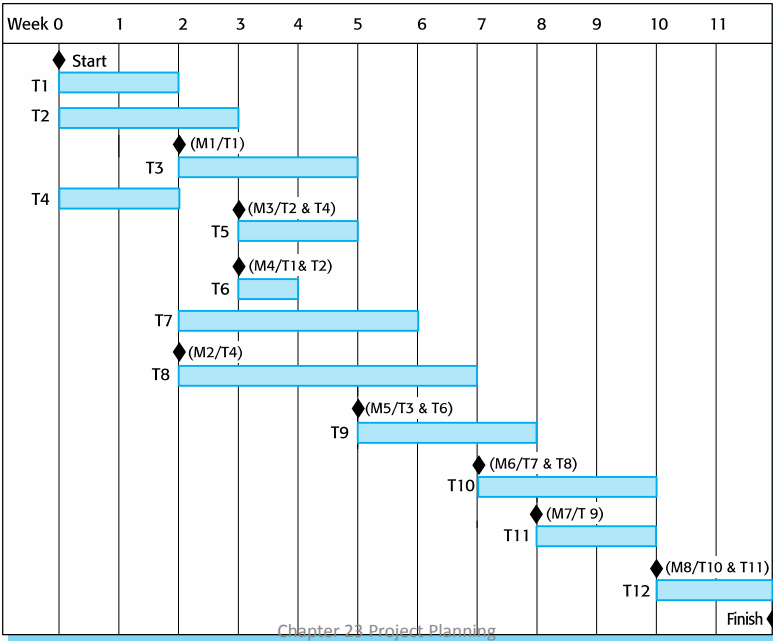
Chapter 23 Project Planning

Staff allocation chart
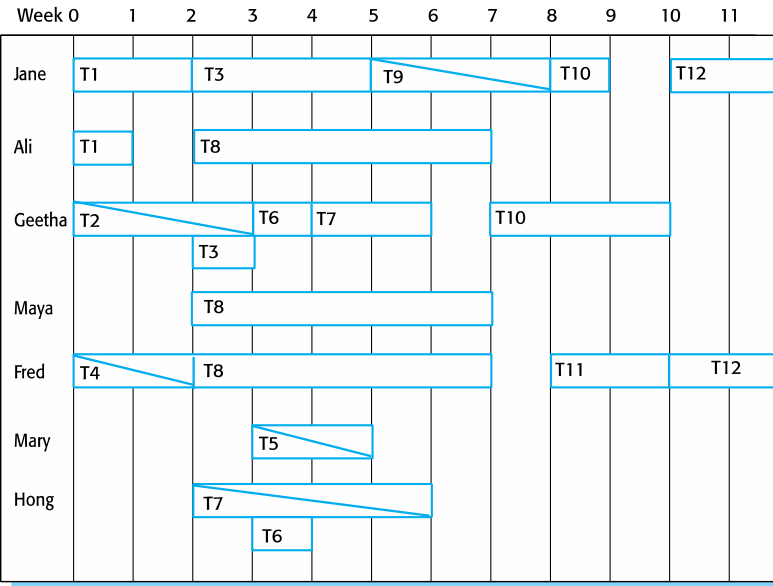
Chapter 23 Project Planning

"What is not on paper has not been said."

Some amount of documentation is needed in business cases.

Motivation is essential…

motivational dips/holes/pits/gaps may appear

- **after a holiday or some other break**
- **after hard intensive work** (project fatigue)
- **when project work is not advancing, perhaps because of a difficult sw/hw problem**
- **when groupmembers are busy with other matters (studies, personal, or work)**
- **because of customer actions (busy, not sure what wants, not responding).**

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Motivation is essential for work

No (wo)man can work many weeks or months on a project without any breaks.

The Gurus ("big boys") say that on every project there are 2-3 motivational dips/holes/pits/gaps (FI: motivaatiokuoppa).

Those low-motivation moments may appear… when or on what occasions ??

(hint: project management is NOT rocket science, so you know the answer).

motivation
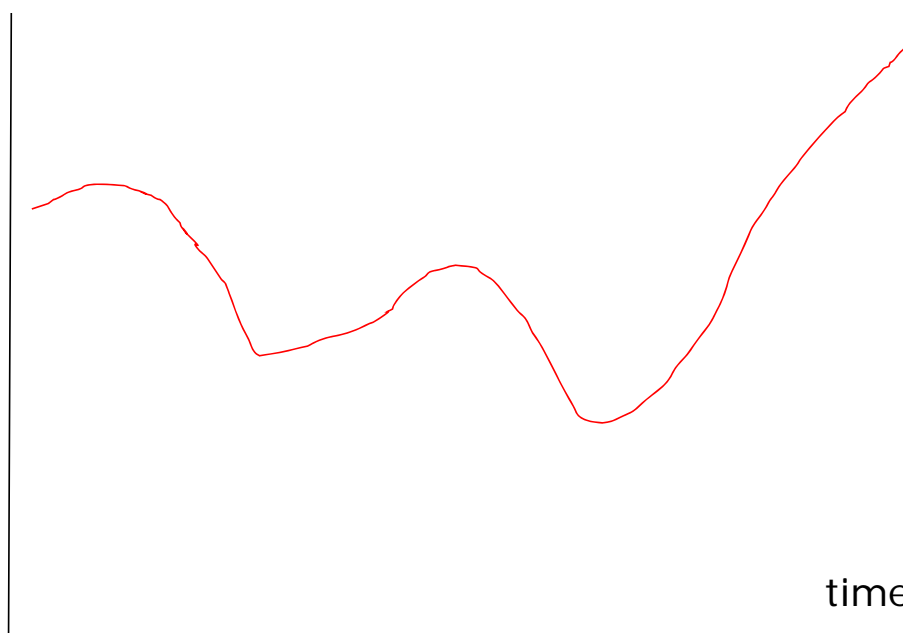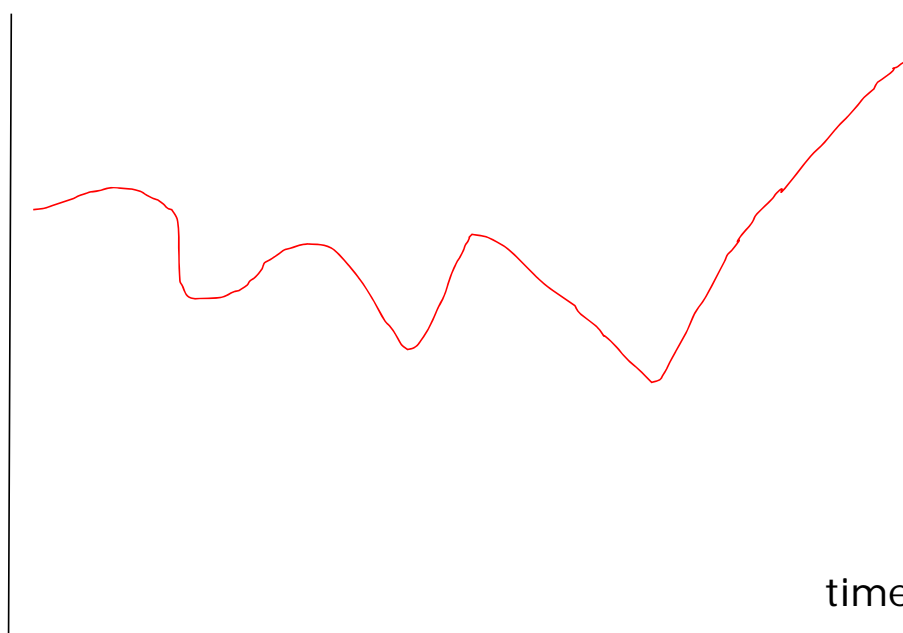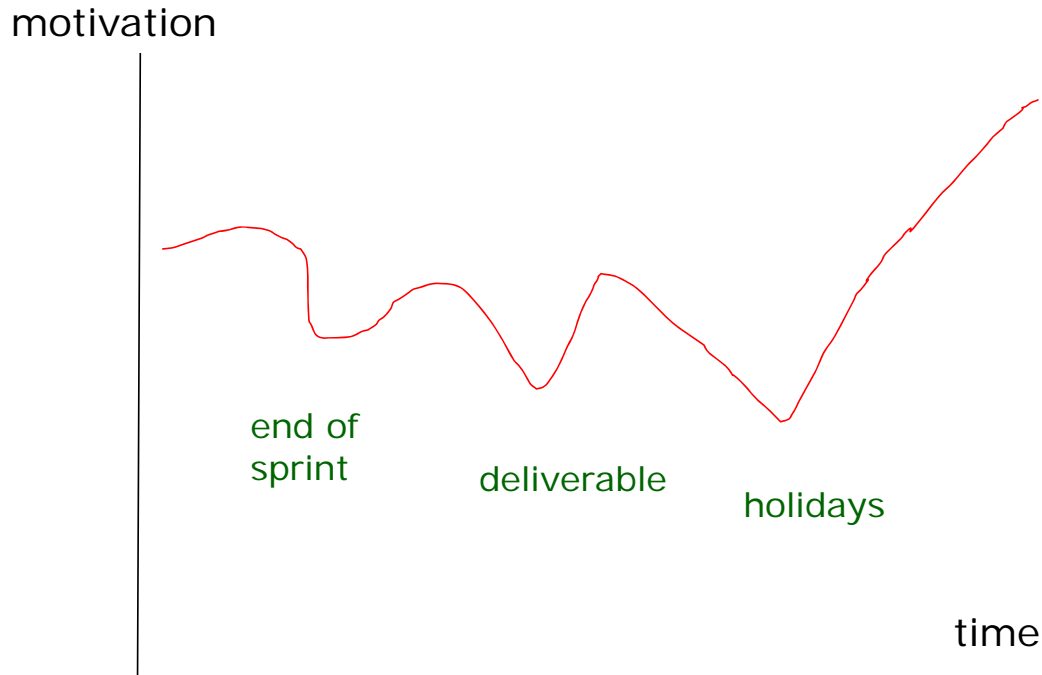
time

motivation

time

motivation

time

end of sprint

deliverable

holidays

Motivation is essential…

motivational dips/holes/pits/gaps may appear
- **after a holiday or some other break**
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- **because of customer actions (busy, not sure what wants, not responding)**
- **because of personal "civilian life" problems.**

Better motivation inside a project group

- project's state is **discussed** openly in weekly meetings
- if you are temporarily very busy with other matters (= not available for this project), **inform** others EARLY (before deadline)
- proceed with the project work with **small steps**, to make at least some visible progress
- have some good time (**party**) after some success or major deadline (e.g. after Sprint end or deliverable)
- sometimes take some **free** time (a few days, or weekend) from the project (even the whole group)
- too much or too little work may lower **motivation** (everybody knows what to do this, and next, week)
- but: also "dull" work has to be done in projects
- remember: other students have survived the course in previous years (so you can, too).

Sometimes, if project is stuck, it may be the best solution if the whole project would be cancelled/terminated.

"Project work goes well as long as less than half of the groupmembers are thinking about suicide."

The big picture:

Portfolio
Programs
   Projects.

[Guide to PMBoK, 5th ed, 2013]
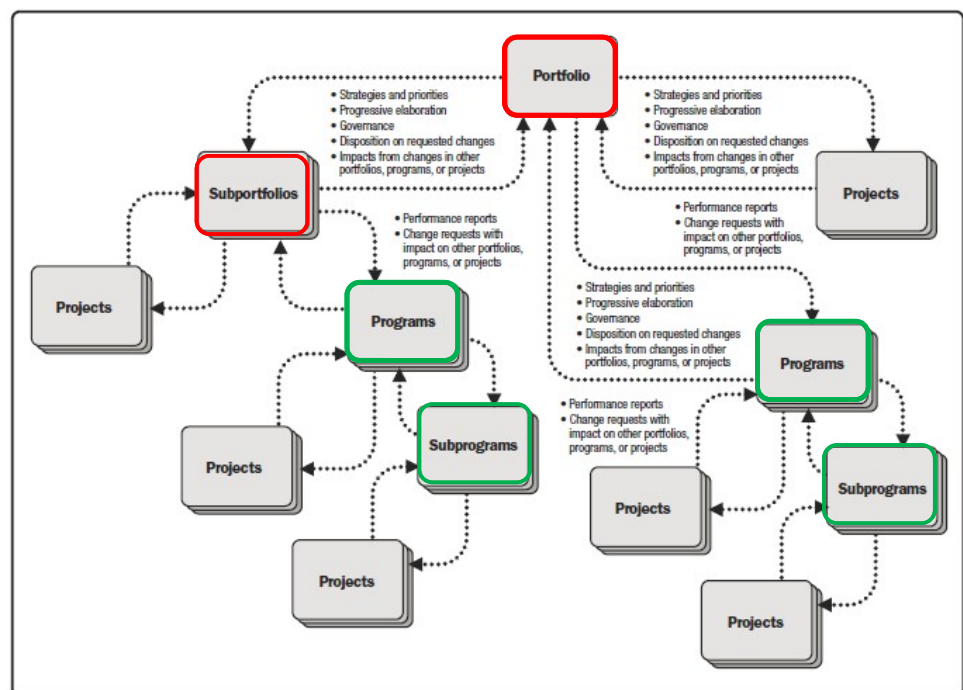
Figure 1-1. Portfolio, Program, and Project Management Interactions

Project management areas
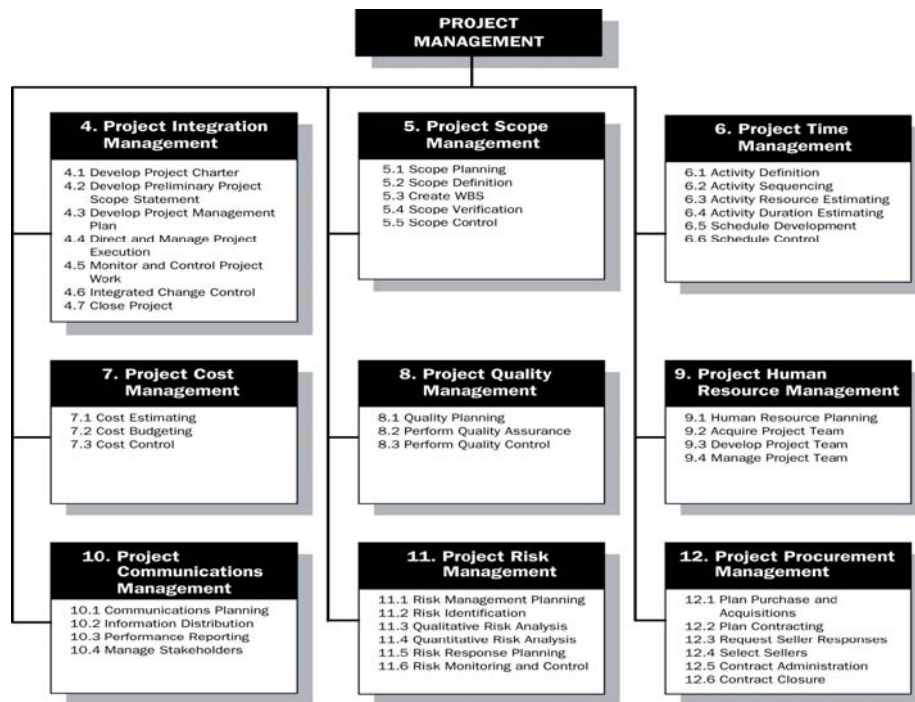
[Guide to PMBoK, 3rd ed, 2004]

Estimation techniques

✧ Organizations need to make software effort and cost estimates. There are two types of technique that can be used to do this:

- ***Experience-based techniques*** The estimate of future effort requirements is based on the manager's experience of past projects and the application domain. Essentially, the manager makes an informed judgment of what the effort requirements are likely to be.

- ***Algorithmic cost modeling*** In this approach, a formulaic approach is used to compute the project effort based on estimates of product attributes, such as size, and process characteristics, such as experience of staff involved.

Estimate uncertainty

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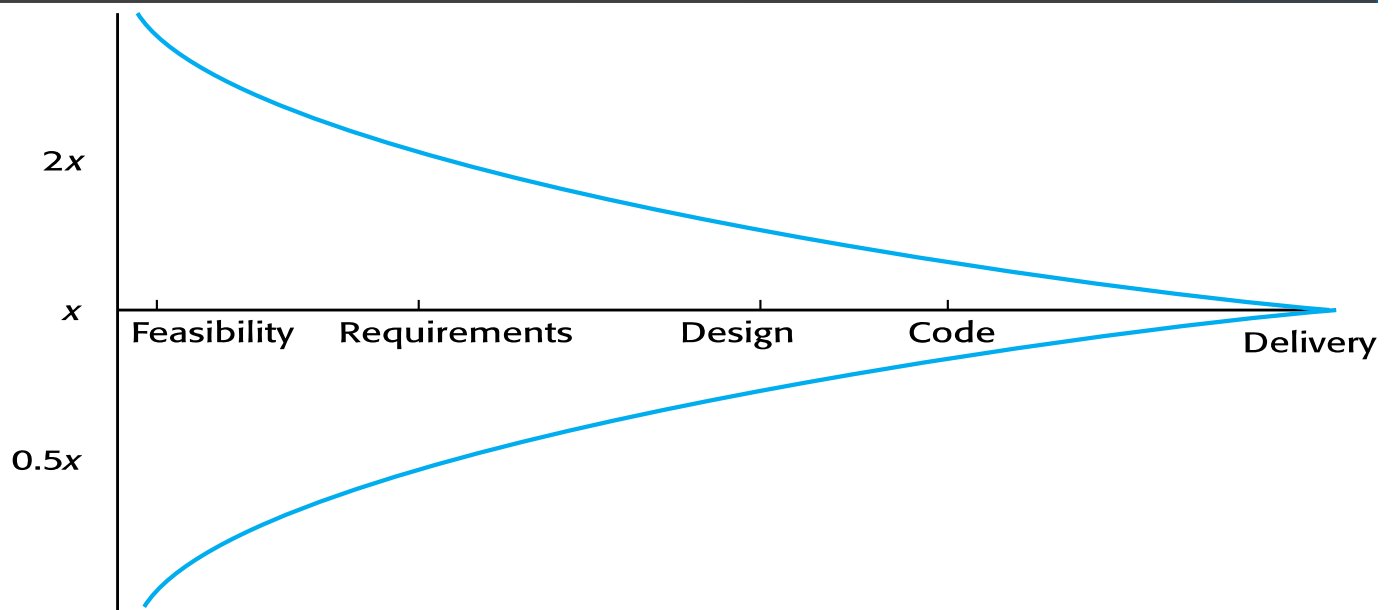
Work Breakdown Structure

WBS

[www.nextlevelconsulting.eu]
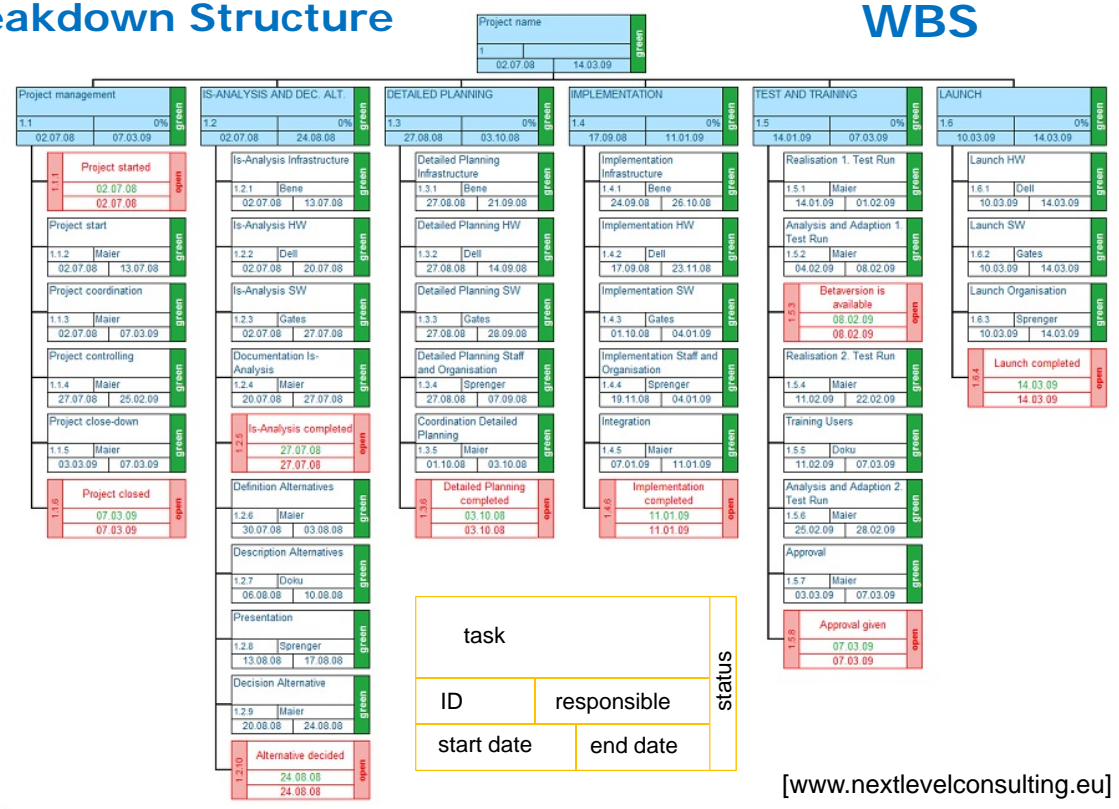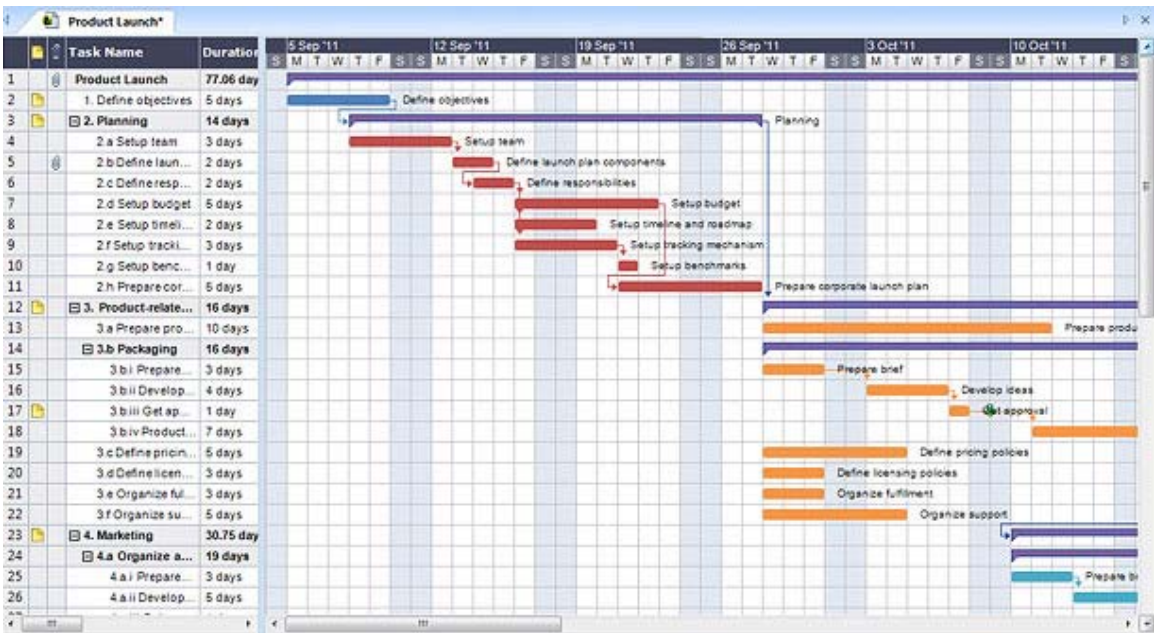
Gantt diagram 1

[http://www.matchware.com]

Gantt diagram, 2
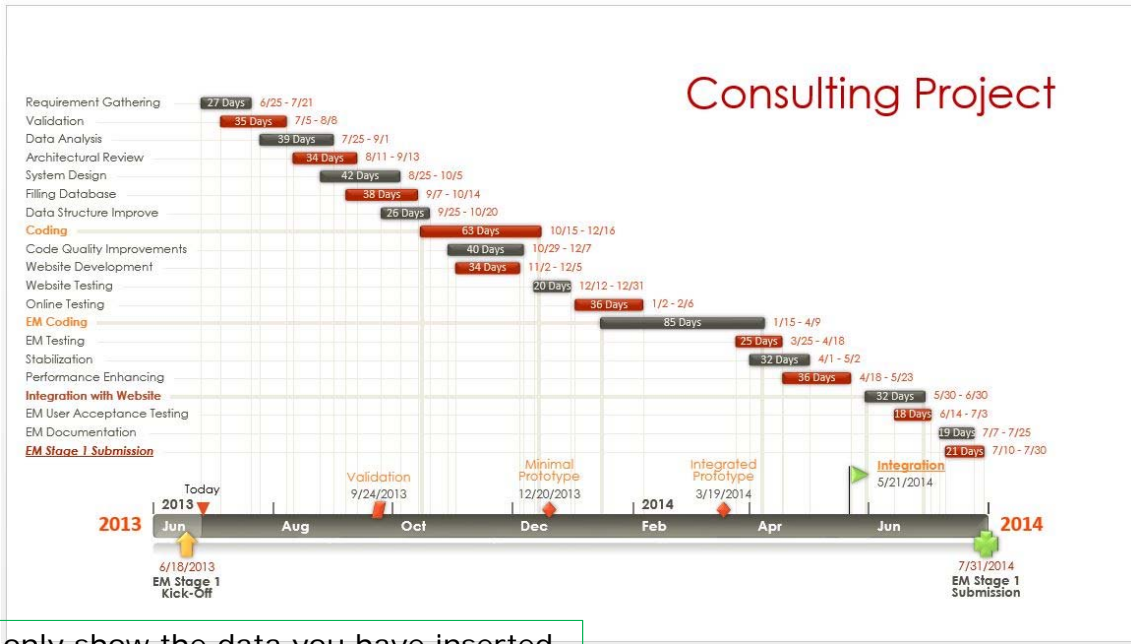
Diagrams only show the data you have inserted.

[www.officetimeline.com]

Gantt diagram, 3

[www.conceptdraw.com]

Gantt diagram, 4

[http://orgmode.org]

Critical Path

[www.meta-manage.com]

One example of a project calendar

Just "one week at a glance" is not good… one month is better.
The whole project at a glance is much better.
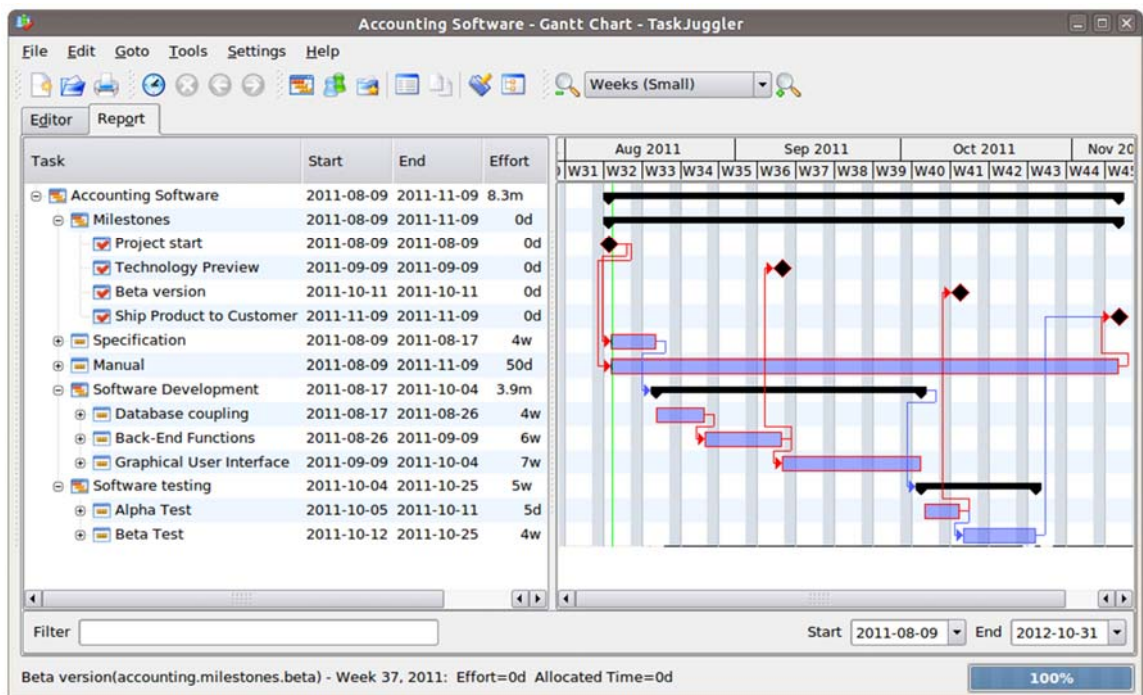
TAU/TUNI * TIE-02306 Introduction to Sw Eng

"How PowerPoint destroyed Space Shuttle"

Review of Test Data Indicates Conservatism for Tile Penetration

- The existing SOFI on tile test data used to create Crater was reviewed along with STS-87 Southwest Research data
  - Crater overpredicted penetration of tile coating **significantly**
    - Initial penetration to described by normal velocity
      - Varies with volume/mass of projectile (e.g., 200ft/sec for 3cu. In)
    - **Significant** energy is required for the softer SOFI particle to penetrate the relatively hard tile coating
      - Test results do show that it is possible at sufficient mass and velocity
    - Conversely, once tile is penetrated SOFI can cause **significant** damage
      - Minor variations in total energy (above penetration level) can cause **significant** tile damage
  - Flight condition is **significantly** outside of test database
    - Volume of ramp is 1920cu in vs 3 cu in for test

Project targets and definition of results

- Project targets and results needs to be **SMART**
    - **S**pecific   (täsmällinen)

    - **M**easurable   (mitattava)

    - **A**ttainable   (saavuttevissa oleva)

    - **R**ealistic   (realistinen)

    - **T**ime-limited   (aikaan sidottu)

- It might be useful to use iterative way of working in preparation and to clear project target(s).
- "You can not expect people to succeed and committed in project, where they don't know what are expected from them."

S pecific
M easurable
A chievable
R elevant
T ime-based

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Containment of project target and results

idea

Agreement / baseline

Customer expectations, hopes, requirements, needs

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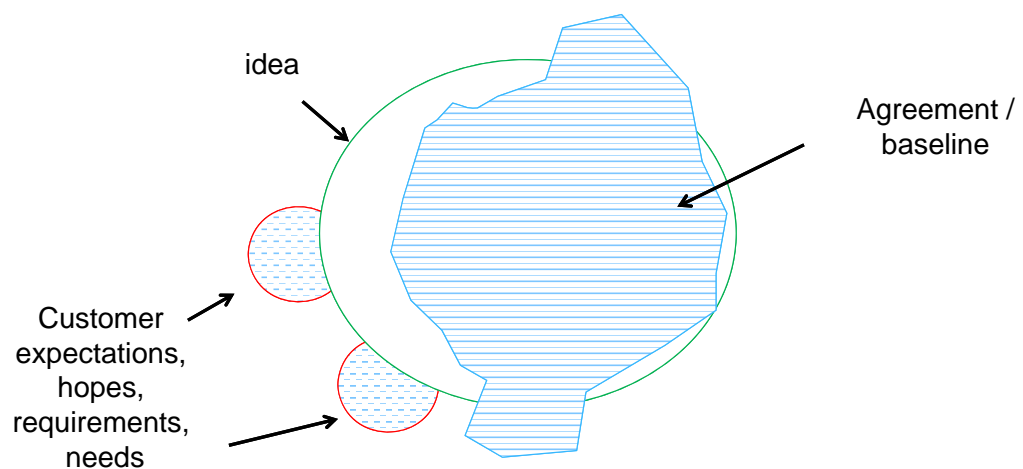
Project reporting

- Reporting to **different organization layers (e.g. mgmt)**
- Reporting to **different stakeholders (e.g. customer)**

- **Efficient reporting**
  - Notice to deviation – baseline is project plan
  - Supports to achieve targets and corrective actions
  - Content:
    - Project **status**
    - **Changes** to earlier report
    - **Implemented work** (e.g. last week)
    - **Planned work** (e.g. coming week)
    - Estimation about **work done/not done**
    - Estimation about **remaining workload**
    - **Needed decisions**
    - Updated **risk status**
    - **Traffic lights** (project result, resources, schedule)

Project meetings

- Very often used – but also expensive – **need needs to be evaluated every time** (vs. scrum daily meeting)

- Meetings **need to be effective**
  - Good **preparing** & agreed playing **rules**
  - All relevant meetings are **described and name given**
  - And **memo** created

- Project can have e.g.
  - Customer meetings
  - Steering meetings
  - Project team meetings
  - Working group meetings
  - Subcontractor/supplier meetings
  - Review meetings
  - Daily stand-up meetings
  - Demo meetings
  - Planning meetings, etc.

Project tools

In project working, only very basic tools are actually needed (so that you know what to do, when to do, how project progresses, who is the boss and who are your teammates = where to find help)

- task list (e.g. Kanban board, Product Backlog, Sprint Backlog)
- calendar (all deadlines, travelling, meetings, etc. marked well in advence)
- communication channels (use as agreed; e.g. proper subject/topic).

Finnish agile "war-story" pdf book

TTL:n Sytyke: **392 vuotta ketteriä kokemuksia**, 02.05.2013, toinen painos, versio 2.0b2, kirja verkossa (pdf-tiedosto 97 sivua):

"Agile Finland ry:n järjestämä vuoden 2012 Scan Agile -konferenssi, jossa Dave Snowden kävi puhumassa. Avainviesti: jos seuraat ketterää menetelmää X, et ole ketterä. Menetelmäkohtaisista dogmeista olisi siis päästävä seuraavalle tasolle: ymmärrettävä, miksi tietyllä tavalla kannattaa toimia ja missä tilanteissa kannattaa kokeilla mitäkin tekniikoita."

http://www.sytyke.org/julkaisut/398-vuotta-ketteria-kokemuksia/

Some organisations, common knowledge

- **IPMA** = International Project Management Association ("european")
- **PMI** = Project Management Institute ("american")

- **SEI** = Software Engineering Institute
- **IEEE** = Institute of Electrical and Electronics Engineers [I-triple-E]

- **PRY** = Projekti(työ)yhdistys **www.pry.fi**
- **TTL** = TIVIA, ex-Tietotekniikan liitto **www.tivia.fi**

Some general well-known links

- http://www.ipma.ch/
    IPMA - International Project Management Association
- http://www.pmi.org/
    Project Management Institute, Inc.
- http://www.apm.org.uk/
    Association for Project Management
- http://www.ieee.org/
    IEEE, pronounced "Eye-triple-E," stands for the Institute of Electrical and Electronics Engineers.
- http://www.sei.cmu.edu/
    Software Engineering Institute (SEI) Carnegie Mellon University

Some books you may find or buy from the internet

- A Guide to the Project Management Body of Knowledge (**PMBOK Guide**), 5th ed., 2013. 6th ed. 2017.

- Guide to the Systems Engineering Body of Knowledge (**SEBoK**), version 2.2, 2019.

- APM Body of Knowledge, 5th edition, 2006. 7th edition 2019.

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Highlights - What to remember

- project work IS teamwork
- **problems at projects are seldom technical ("hard"), but "soft"**
- agree project guidelines, regulations and rules, and follow them
- help your teammates
- remember professional ethics
- be honest, give constructive feedback
- if you see problems in project, tell your superior/boss about them, don't hide
- understand that sometimes there are "slow flow" on your or groupmember's work
- sometimes it is good to use humour in difficult situations.

"Workload is not killing, it is challenging."
"Student's life is not always miserable, sometimes it is just a bad day."